ported. There were imported, largely from America, in 1877, 498 head; in 1882, 1,430. Another obstacle which stock-raising must encounter is the difficulty in the way of pasturage. The scant herbage is unfitted for blooded stock, and the raising of grasses or grain will be unprofitable. In the inland regions the farmers of small means often keep a horse or a cow, not for work, but solely for the manure derived from it. It shows strikingly the lack of capital everywhere so prevalent. When a farmer finds an ox or a cow too costly, he buys a superannuated or broken-down pack-horse that can hardly stand, feeds it, and carefully collects the manure.

Notwithstanding all the obstacles, the importation and improvement of cattle in Japan, the author believes, should certainly not be abandoned. By a proper study of natural conditions, stock-raising may do much toward bettering the circumstances of the Japanese people.

A BOOK-MANUFACTORY IN ANCIENT ROME.

IN the *Illustrirtes schweizerisches unterhaltungsblatt für stenographen*, the *Publishers' weekly* finds an interesting account of the production of books in ancient Rome. It is stated therein, that, notwithstanding the Romans had no printing-presses, books were at that time produced much more quickly and in larger numbers than most modern works. Paper was used which was almost woven out of the fibre of the Egyptian papyrus, which grows to a height of ten feet, and which has given its name to paper. A Roman residing in Egypt assures us that the yield of his paper-manufactory would be sufficient to support an army, and whole shiploads of paper were sent from Egypt to Rome. Before books of any description were reproduced in large numbers, they were read mostly either in private circles or publicly, so that the author could adopt suggestions for the improvement of his work. Wealthy Romans used to own a large number of slaves for all kinds of services, which rendered labor cheap, as they cost nothing in many cases, and had only to be supported. They were mostly prisoners of war, the pick of nations, and often more cultivated (especially the Greeks) than their masters. They were consequently also employed in the education of Roman boys. The works of authors were dictated to a number of slaves, women also being employed for that purpose. Even among freemen and liberated slaves the desire to obtain employment became so great, that hundreds of willing hands could be had for writing books at a very low rate of wages. The instruction imparted in the workshops of Roman publishers necessitated a regular course of training, which was to teach the apprentices an easy and elegant handwriting. If a publisher had at his disposal, say, a hundred writers, and reckoning the working-day at ten hours, a document which took an hour to write would be multiplied in the course of a day to a thousand copies. The writers became in time expert to such a degree that they combined quickness with elegance. It must also be added that in cases where speed was the first consideration, the use of stenographic contractions became general, and we possess illustrations of their employment in the old manuscripts still in existence. We are also informed that both readers and copyists were instructed and trained, the former in the solution, the latter in the application, of contractions. Their object was to copy works as quickly as possible, the use of full words being only resorted to for the best works. The above brief account demonstrates the fact that the Romans made the nearest approach to the invention of printing, although they never attained to it. The movable stamps of iron or other metals used by the Romans for marking earthenware vessels or other utensils also prove this. But the art of rapid writing, which was perfected by them to an unusual degree, counteracted a further development, while the number of slaves and other willing hands at disposal, by which means the most astonishing results were obtained, operated in the same direction.

THE HEATING-POWER OF GAS.

THE introduction of the gas-engine and the increased use of ordinary illuminating-gas for domestic heating-purposes, renders its calorific properties of far more importance than they were a few years ago, says *Engineering*. The experiments made on this subject do not appear to have been very exhaustive, and, if we may judge by those we are about to quote, have not always been carried out with due care. M. Aimé Witz, whose researches in connection with the gas-engine are well known, has lately made some experiments in order to determine with greater accuracy the heating-power in ordinary French illuminating-gas. His apparatus was composed of an explosion-cylinder of nickel-plated steel 2.36 inches internal diameter and 3.54 inches high. The thickness of the metal was .079 of an inch. The top and bottom covers were tightly screwed on, rendering the chamber air-tight. Through the top cover a wire passed, and on the bottom was a valve for filling or emptying the receptacle. This cylinder was contained in a vessel 4 inches in diameter and